



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/650,729	08/29/2003	Chung-Peng Ho	241330US6YA	7660

22850 7590 09/27/2005

OBLON, SPIVAK, MCCLELLAND, MAIER & NEUSTADT, P.C.
1940 DUKE STREET
ALEXANDRIA, VA 22314

EXAMINER

CHACKO DAVIS, DABORAH

ART UNIT	PAPER NUMBER
----------	--------------

1756

DATE MAILED: 09/27/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/650,729

Applicant(s)

HO ET AL.

Examiner

Daborah Chacko-Davis

Art Unit

1756

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 06 July 2005.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-39 is/are pending in the application.
- 4a) Of the above claim(s) 33 and 34 is/are withdrawn from consideration.
- 5) ☒ Claim(s) 2-4 is/are allowed.
- 6) ☒ Claim(s) 1,5,7,9-11,16,18-26,30,32 and 35-39 is/are rejected.
- 7) ☒ Claim(s) 6,8,12-15,17,27-29,31 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date 07/05.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

2. Claims 1, 5, 9, 10, 11, 16, 18, 19-21, are rejected under 35 U.S.C. 102(b) as being anticipated by Journal of Vacuum Science and Technology, B 19 (6), 2353-2356 Nov/Dec 2001, "Immersion Lithography at 157nm" (M. Switkes et al., herein after referred to as Switkes).

Switkes, in the introduction, and in exposure (paragraph III), discloses an immersion lithography method of forming a pattern on a resist coated substrate that is exposed to radiation in a liquid immersion lithography system, drying the exposed resist by applying a fluid (drying fluid dispensed on the exposed resist) on the exposed resist in order to remove the immersion fluid on the surface of the exposed resist surface (claims 1, 5, 10, 16). Switkes, in the paragraph II, discloses that the resist employed for exposure is a 157nm photoresist (claims 9, 18). Switkes, in the paragraph III, discloses forming a resist is spin coated on the substrate and baked prior to exposure, the baked resist is exposed to radiation in an immersion lithography, the exposed resist is post exposure baked (cured), and then developed to form a line and space pattern (claims 11, 19-20).

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

4. Claim 7 is rejected under 35 U.S.C. 103(a) as being unpatentable over Journal of Vacuum Science and Technology, B 19 (6), 2353-2356 Nov/Dec 2001, "Immersion Lithography at 157nm" (M. Switkes et al., herein after referred to as Switkes) in view of Journal of Vacuum Science and Technology, B 17 (6), 3306-3309 Nov/Dec1999, "Liquid Immersion deep-ultraviolet interferometric lithography" (Hoffnagle et al., herein after referred to as Hoffnagle).

Switkes is discussed in paragraph no. 2.

The difference between the claims and Switkes is that Switkes does not disclose that baking the substrate after drying promotes acid diffusion in the resist film (claim 7).

Hoffnagle, in paragraph III, discloses that the resist film irradiated in the immersion lithography apparatus is a chemically amplified resist film, and that upon exposure acid diffusion occurs in the resist.

Therefore, it would be obvious to a skilled artisan to modify Switkes by employing a chemically amplified resist as the resist film for exposure as suggested by Hoffnagle because Hoffnagle, in paragraph III, discloses using a chemically amplified resist along with interferometric lithography in the immersion apparatus enables the formation of small features that can be written optically.

Art Unit: 1756

5. Claims 22-26, 30, 32, and 35-39, are rejected under 35 U.S.C. 103(a) as being unpatentable over Journal of Vacuum Science and Technology, B 19 (6), 2353-2356 Nov/Dec 2001, "Immersion Lithography at 157nm" (M. Switkes et al., herein after referred to as Switkes) in view of U. S. Patent Application Publication No. 2005/0007567 (Pierrat et al).

Switkes, in the introduction, in the Index Matching Medium (paragraph II), and in the Exposures (paragraph III), discloses a method of forming a pattern on a resist coated substrate that is exposed to a radiation source in a liquid immersion lithography system, drying the exposed resist by applying a fluid (drying fluid dispensed on the exposed resist) on the exposed resist in order to remove the immersion fluid (PFPE) on the surface of the exposed resist surface (claims 23, 24, 26, and 30). Switkes, in the paragraph II, discloses that the immersion lithography system performs an exposure on a 157nm photoresist (claim 32).

The difference between the claims and Switkes is that Switkes does not disclose that a track system is coupled to the immersion lithography system, wherein the track system includes at least one of the units (separate from the lithography system) recited in claims 22, 25, 35, 36, and 37.

Pierrat, in [0080], [0081], and [0083], discloses that a cleaning unit, and drying unit is coupled to the immersion lithography system (through a track system or a conveyor).

Therefore, it would be obvious to a skilled artisan to modify Switkes by employing the track system (conveyor system) taught by Pierrat, because Pierrat, in [0080], [0082],

Art Unit: 1756

discloses that positioning the cleaning or drying system in close proximity to the wafer stage minimizes throughput losses, and enables the processes to be performed on the wafer in a plasma environment (a controlled environment).

Allowable Subject Matter

6. Claims 2-4, are allowed.
7. Claims 6, 8, 12-15, 17, 27-29, and 31, are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Response to Arguments

8. Applicant's arguments filed July 6, 2005, with respect to claims 1, 5, 7, 9-11, 16, 18-26, 30, 32, and 35-39, have been considered but are moot in view of the new ground(s) of rejection. The 102 and 103 rejections made in the previous office action have been withdrawn.

Conclusion

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Daborah Chacko-Davis whose telephone number is (571) 272-1380. The examiner can normally be reached on M-F 9:30 - 6:00. If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Mark F Huff can be reached on (571) 272-1385. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Art Unit: 1756

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

dcd 

September 20, 2005.


JOHN A. MCPHERSON
PRIMARY EXAMINER